

## 1.11 Following Energy

## Movement in Ecosystems

Notes:

Trophic levels - Create a pyramid diagram in your note books

Sunlight

Producers

Primary consumers

Secondary consumers

Tertiary consumers

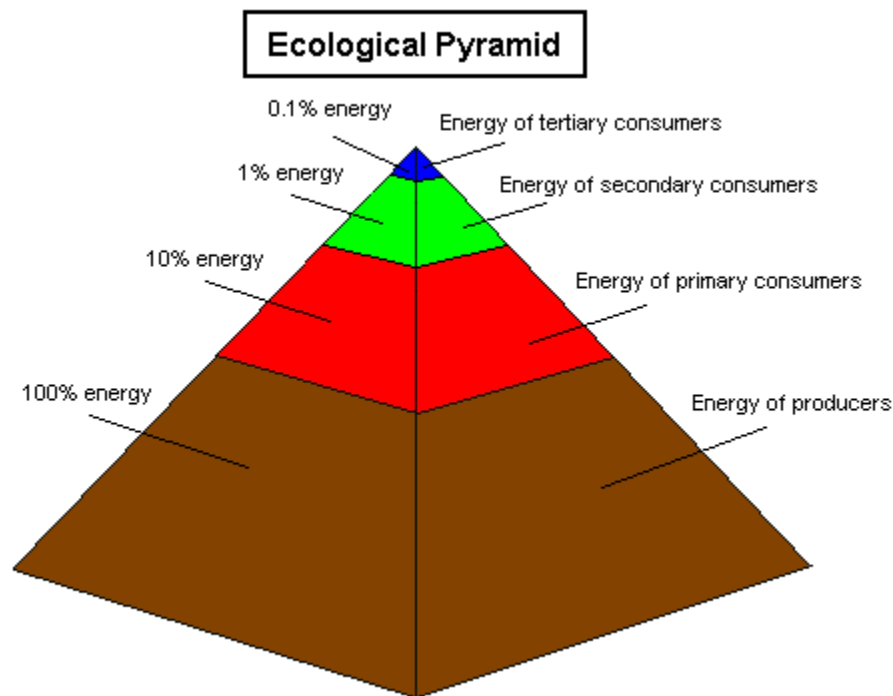
**Autotrophs** absorb solar energy from the sun and transform it into chemical energy. Some energy is used or consumed by this process and some is stored as starch and carbohydrates, (sugars and glucose)

Laws of Thermodynamics

1. Although energy can be transformed for one form to another it can never be destroyed.
2. During any energy transformation, some energy is converted into a form, mostly heat that cannot be used.
3. There are limits on energy transfers and the number of trophic levels. The amount of energy in a system can never equal zero and input equals output

Ecological pyramids and the limits of energy transfer and the number of trophic levels:

1. Pyramid of **Energy** - can help determine **how many species can be supported** for each trophic level. Each level requires a certain amount of energy to live, grow, reproduce, create shelter... **life process**. Only so much energy is available and passed on from one level to the next.



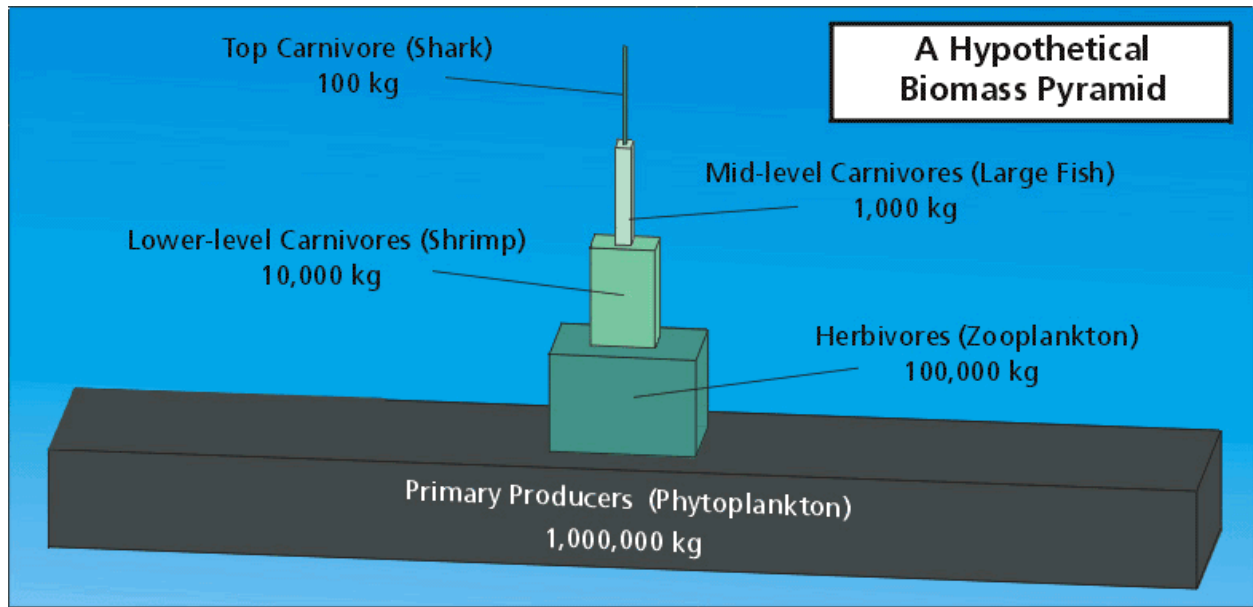
## 2. Pyramid of **Numbers**

- a. Is created by **counting the number** of organisms at each trophic level in an ecosystem.



b. Some times exceptions occur, such as when one maple tree can support thousands of sap sucking aphids. What would the pyramid look like then

3. Pyramid of **Biomass** - Biomass is the **weight of previously living matter** after the water content has been removed by drying. Each trophic level would have certain amounts of biomass. The amount of biomass decreases with each higher trophic level. Biomass represents the "amount of organic material" in each trophic level.



The energy budget:

Producers need to continually restore energy levels in food chains.

Primary consumers have access to the most energy.

Human have a huge impact on food energy demands in the world. This demand has increased by increasing life spans which is a result of:

1. Increasing and improving food supply
2. Increasing and improving health care

These two facts have increased human population and demands on the environment. The demands are accelerating

with the continued growth of the human population to the point that ecosystems are at risk of collapsing.

Historical changes that have brought these increased demands:

Hunter gathers → Agriculture Revolution → Industrial Revolution.

This cultural shift allowed easier access to food and increased demands on energy which created population growth.

Increasing populations place greater demands on ecosystems.

Read and be able to answer the Understanding Concepts page 39.